

2006 Laser Survey

Electronic Levels (beam coverage greater than 1,000 feet)

Manufacturer	AGL	AGL	CST/berger	LaserMark by CST/berger	David White by CST/berger	DeWalt	DeWalt	Laser Reference Inc.
Model	EAGL 1000	EAGL 100	57-LM800DI	LMH	3150	DW077KD	DW076KE	L4+
Date of introduction	1996	2005	Jan-05	Aug-01	Aug-03	Sep-02	Mar-06	Mar-99
Beam type	Infrared	Infrared	[1]	Visible 650 nm laser diode	[2]	Visible red, 635 nm	Visible red, 650 nm	633nm
Beam coverage	2,000 ft	2,000 ft	2,000 ft	Up to 2,000 ft	Up to 2,000 ft	2,000 ft	2,000 ft	2,000 ft
Rotation speed	600 rpm	600 rpm	Variable	600 rpm	Variable: 150, 300, 600 rpm	0 - 800 rpm	600 rpm	0-450 rpm
Compensation or self-leveling type	Compensation	Electronic self-leveling	Electronic	Electronic self-leveling	Electronic self-leveling	Electronic servo	Electronic servo	Compensated self leveling
Compensation or self-leveling range	± 10 arc minutes (± 1/6°)	± 4°	± 5°	± 5°	± 5°	± 5°	± 5°	±10 arc minutes
Self-leveling speed	Instant when rough leveled	Typical: < 10 seconds	1/4 second	0.5 minutes	0.5 minutes			
Accuracy								
- Degrees	± 7 arc seconds	± 8 arc seconds	± 10 arc second			± 20 arc seconds	± 20 arc seconds	±10 arc seconds
- Variance per 100 feet	± 1/24 in	± 1/20 in	1/16 in	± 1/16 in	± 1/8 in	± 1/8 in	± 1/8 in	± 1/16 per 100'
Power source	4 D alkaline or NiCd	4 D alkaline or NiCd	Ni-Cad rechargeable pack	4 D alkaline	4 D alkaline batteries	[1]	[1]	4 C-cells/NiMH rechargeable
Battery life								
- Alkaline	90 hours	100 hours		± 70 hrs	±70 hrs	N/A	N/A	70
- Rechargeable	45 hours	40 hours	15 hours	± 30 hrs	±30 hrs	38 hours [2]	38 hours [2]	50
Operating temperature	14 to 122° F	14 to 122°F	22 to 120° F	22 to 120° F	22 to 120° F	-7 to 50°C	-7 to 50°C	0 to 122°F
Water and dust sealed?	IPX4	IP55	IPX7	IPX4	IPX4	IPX4	IPX4	Resistant
Warranty	1 yr; 2nd yr opt. \$150	2 yrs; 3rd yr opt. \$150	2 years	2 years	2 years	[3]	[3]	3 years
Laser Sensor included	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
- Price if purchased separately	\$295	\$295	\$295					\$225
Package price	\$1,375 alk/\$1,510 NiCd	\$1,495		\$995	\$1345	\$1,199	\$999	\$995

Manufacturer	Leica Geosystems	Mikrofyf Positioning Products	Mikrofyf Positioning Products	Mikrofyf Positioning Products	Mikrofyf Positioning Products	Mikrofyf Positioning Products	Mikrofyf Positioning Products
Model	Rugby 100LR	ML 10x	ML 11x	ML 13x	ML 14VD	ML 15VD	ML 2H
Date of introduction	Nov-02	2003	2003	2003	2003	2003	1998
Beam type	780 nm invisible laser diode	650 nm visible	650 nm visible	650 nm visible	635 high powered diode	635 high powered diode	670 nm visible
Beam coverage	2,500 ft/770 m	> 1,050' dia	> 1,050' dia	> 1050' dia	> 1,050' dia	> 1,050' dia	> 3,000' dia
Rotation speed	300/600 rpm [1]	600	600	600	30/60/180/360/600 rpm + Scan	30/60/180/360/600 rpm + Scan	300/600/900 rpm
Compensation or self-leveling type	Electronic self-leveling [2]	Electronic self-leveling	Electronic self-leveling	Electronic self-leveling H/V	Electronic self-leveling H/V	Electronic self-leveling H/V	Electronic self-leveling
Compensation or self-leveling range	± 5° [3][4]	± 9%	± 9%	± 9%	± 9%	± 9%	± 18%
Self-leveling speed	Typical: <10 seconds	< 8 seconds typical	< 8 seconds typical	< 8 seconds typical	< 8 seconds typical	< 8 seconds typical	< 8 seconds typical
Accuracy							
- Degrees	± 10 arc seconds or better	± 10 arc seconds	± 10 arc seconds	± 10 arc seconds	± 10 arc seconds	± 10 arc seconds	± 10 arc seconds
- Variance per 100 feet	± 1/16 in. (± 1.5 mm)	< 1/16 in (1.7 mm)	< 1/16 in (1.7 mm)	< 1/16 in (1.7 mm)	< 1/16 in (1.7 mm)	< 1/16 in (1.7 mm)	< 1/16 in (1.7 mm)
Power source	4 D-cells, NiMH Pack	NiCad/NiMH 1 hr. charge [1][2]	NiCad/NiMH 1 hr. charge [1][2]	NiCad/NiMH 1 hr. charge [1][2]	NiCad/NiMH 1 hr. charge [1][2]	NiCad/NiMH 1 hr. charge [1][2]	Internal battery [2]
Battery life							
- Alkaline	60 hours						
- Rechargeable	35 hours	30 hours	30 hours	30 hours	30 hours	30 hours	22 hours
Operating temperature	-4 to 122°F / -20 to 50°C	-4 to 122°F (-20 to 50°C)	-4 to 122° F (-20 to 50° C)	-4 to 122° F (-20 to 50° C)	-4 to 122°F (-20 to 50°C)	-4 to 122°F (-20 to 50°C)	-4 to 122° F (-20 to 50° C)
Water and dust sealed?	IPX6	Yes (IP 67)	Yes (IP 67)	Yes (IP 67)	Yes (IP 67)	Yes (IP 67)	Yes (IP 67)
Warranty	2-year knockdown [5]	2 years	2 years	2 years	2 years	2 years	2 years
Laser Sensor included	Yes	Yes (IP 67)	Yes (IP 67)	Yes (IP 67)	Yes (IP 67)	Yes (IP 67)	Yes (IP 67)
- Price if purchased separately	\$150 to \$325	\$325	\$325	\$325	\$325	\$325	\$325
Package price	\$1420 to \$1650	\$995	\$1,195	\$1,395	\$1,580	\$1,580	\$2,495

Numbers in brackets refer to notes (see page 62).

2006 Laser Survey

Electronic Levels (beam coverage greater than 1,000 feet)

Manufacturer	Mikrofyn Positioning Products	Mikrofyn Positioning Products	Mikrofyn Positioning Products	NWI by NORTHWEST	NWI by NORTHWEST	SOKKIA	SOKKIA
Model	ML 2	ML 2 VD	ML 2 VD-Remote Controlled	NRL600	NRL602	LP30A	LP310
Date of introduction	1998	1998	1998	2006	2006	Feb-03	Jun-05
Beam type	670 nm visible	670 nm visible	670 nm visible	635 visible	635 visible	InfraRED	InfraRED
Beam coverage	> 3,000' dia	> 5600' dia	> 5600' dia	1,600 ft	1,600 ft	2,000 ft	2,000 ft
Rotation speed	300/600/900 rpm	300/600/900 rpm	300/600/900 rpm	0 - 600 rpm	0 - 600 rpm	600 rpm	600 rpm
Compensation or self-leveling type	Electronic self-leveling H/V	Electronic self-leveling H/V	Electronic self-leveling H/V	Electronic self-leveling	Electronic self-leveling H/V	Compensation	Self-leveling
Compensation or self-leveling range	± 18%	± 18%	± 18%	± 4°	± 4°	± 10 minutes arc	± 10 minutes arc
Self-leveling speed	< 8 seconds typical	< 8 seconds typical	< 8 seconds typical	5 seconds	5 seconds	N/A	N/A
Accuracy							
- Degrees	± 10 arc seconds	± 10 arc seconds	± 10 arc seconds			7 arc seconds	10 arc seconds
- Variance per 100 feet	< 1/16 in (1.7 mm)	< 1/16 in (1.7 mm)	< 1/16 in (1.7 mm)	1/8 in	1/8 in	1/25 in @ 100 ft	1/16 in @ 100 ft
Power source	Internal battery [2]	Internal battery [2]	Internal battery [2]	C-cell battery	C-cell battery	4 x D cell or NiCd	4 x D cell or NiCd
Battery life							
- Alkaline				15 hours	15 hours	90 hours	100 hours
- Rechargeable	22 hours	22 hours	22 hours			40 hours	40 hours
Operating temperature	-4 to 122° F (-20 to 50° C)	-4 to 122° F (-20 to 50° C)	-4 to 122° F (-20 to 50° C)	20 to 120°F	20 to 120°F	14 to 122°F	14 to 122°F
Water and dust sealed?	Yes (IP 67)	Yes (IP 67)	Yes (IP 67)	IP64	IP64	IPX4	IP55
Warranty	2 years	2 years	2 years	1 year	1 year	1 year	1 year
Laser Sensor included	Yes (IP 67)	Yes (IP 67)	Yes (IP 67)	No	No	LR100	MR310
- Price if purchased separately	\$325	\$325	\$325	\$195	\$195	\$285	\$295
Package price	\$2,995	\$3,495	\$4,200	\$745	\$794	\$1,495	\$1,495

Manufacturer	Spectra Precision Laser	Spectra Precision Laser	Spectra Precision Laser	Topcon	Topcon	Western Latitudes/Profile	Western Latitudes/Profile
Model	LL500	LL400	HV401	RL-H3A	RL-H3CL	PLP-180	PLP-190
Date of introduction	Mar-02	Sep-05	Oct-05	Mar-02	Jan-05	Jul-05	Jul-05
Beam type	1 mW, 670 nm visible	650 nm class 2 spotting beam	635 nm [3]	Visible red laser diode	Visible red laser diode	Visible red laser diode	Visible red laser diode
Beam coverage	1,600 ft	1,600 ft	2,000 ft	2300 ft (700m)	2,000 ft (610 m)	2,000 ft	2,000 ft
Rotation speed	600 rpm	600 rpm	Variable, 0-600 RPM	600 rpm	600 rpm	600 rpm	0 to 1000 rpm
Compensation or self-leveling type	Compensation	Electronic self-leveling	Electronic self-leveling H/V	Electronic w/Liquid compensator	Electronic	Electronic self-leveling [1]	Electronic self-leveling
Compensation or self-leveling range	± 11 arc minutes	± 5°	± 5°	± 3 degrees	± 3°	± 5°	± 5°
Self-leveling speed	Instant when roughly leveled	5°/min	5°/min	.5 degree per second	N/A	< 30 seconds	< 30 seconds
Accuracy							
- Degrees	± 10 arc seconds	± 10 arc seconds	± 10 arc seconds	± 8 arc seconds	± 10 arc seconds	± 10 arc seconds	± 10 arc seconds
- Variance per 100 feet	± 1/16 in	± 1/16 in	± 1/16 in	3/64 in (1.3mm)	<1/16 in (1.7 mm)	± 1/16	± 1/16
Power source	Alkaline or NiCad	Alkaline or NiMH	Alkaline or NiMH	4 D cells	4 C-cells	NiCad or 4 D alkaline	NiCad or 4 D alkaline
Battery life							
- Alkaline	55 hours	90 hours	90 hours	120 hours	60 hours	75 hours	75 hours
- Rechargeable	40 hours	55 hours	55 hours	60 hours	N/A	14 hours	14 hours
Operating temperature	-20 to 50°C	-20 to 50°C [2]	-20 to 50°C [2]	-4 to 122° F (-20° to 50° C)	-4 to 122° F (-20 to 50° C)	22 to 120°F	22 to 120°F
Water and dust sealed?	Yes	Yes	Yes	Yes	Yes	IPX4	IPX4
Warranty	2 years	1 year	1 year	2 years	2 years	2 years	2 years
Laser Sensor included	Yes	Yes	Yes	LS-70B [1]	LS-70B [1]	Yes	No
- Price if purchased separately	Contact Trimble rep	Contact Trimble rep	Contact Trimble rep	\$365 [2]	\$365 [2]	\$225	\$225
Package price	Contact Trimble rep	Contact Trimble rep	Contact Trimble rep	\$1695	\$1195	\$1195 NiCd	\$1285 NiCd [2]

2006 Laser Survey

Electronic Levels (beam coverage up to 1,000 feet)

Manufacturer	AGATEC, div. of AGL	AGATEC, div. of AGL	AGATEC, div. of AGL	AGATEC, div. of AGL	AGL	CST/berger	LaserMark by CST/berger	Laser Reference Inc.
Model	AGATEC 220	LT200	AGATEC 510	LT300	EAGL 400	57-LMH-CU	LM1000	L4
Date of introduction	2005	2005	2005	2005	1996	Feb-02	Mar-03	Aug-97
Beam type	Visible laser diode	Visible laser diode	Visible split beam [3]	Visible split beam [3]	Infrared	650 nm visible diode	[2]	670 nm
Beam coverage	1,000 ft	1,000 ft	1,000 ft	1,000 ft	1,000 ft	360°	Up to 1,000 ft	1,500 ft
Rotation speed	0, 90, 600 rpm	0, 90, 600 rpm	0, 90, 150, 300, 450, 600 rpm	0, 90, 150, 300, 450, 600 rpm	600 rpm	600 RPM	[3]	600 rpm
Compensation or self-leveling type	Electronic self-leveling [1]	Electronic self-leveling	H & V electronic self-leveling	H & V electronic self-leveling	Compensation	Electronic	Compensated	Compensated self-leveling
Compensation or self-leveling range	± 5.7° [2]	± 5.7° [2]	± 5.7° [2]	± 4.5° [2]	± 10 arc minutes (± 1/6°)	± 5°	± 5°	± 10 arc minutes
Self-leveling speed					Instant when rough leveled	1¼ seconds	3 seconds	
Accuracy								
- Degrees	± 20 arc seconds	± 20 arc seconds	± 20 arc seconds	± 20 arc seconds	± 7 arc seconds	± 27 arc seconds		± 10 arc seconds
- Variance per 100 feet	± 1/8 in	± 1/8 in	± 1/8 in	± 1/8 in	± 1/24 in	5/32 in	± 1/8 in	± 1/16 per 100'
Power source	NiCd (alkaline pack incl.)	NiCd rechargeable	NiCd (alkaline pack incl.)	NiCd rechargeable	4 D alkaline or NiCd	4 D-cell	Ni-Cad cartridge pack	4 Calkaline/NiMH rechargeable
Battery life								
- Alkaline	160 hours		160 hours		90 hours	75 hours	N/A	70
- Rechargeable	40 hours	40 hours	40 hours	40 hours	45 hours	30 hours	12+ hours	55
Operating temperature	14 to 122° F	14 to 122°F	14 to 122° F	14 to 122° F	14 to 122° F	22 to 120° F	22 to 120° F	0 to 122°F
Water and dust sealed?	IP64	Yes, IP67	IP64	IP67	IPX4	IPX4	IPX4	Resistant
Warranty	1 year	1 year	1 year	1 year	1 yr; 2nd yr opt. \$150	2 years	1 year	3 years
Laser Sensor included	Yes	MR80S	Yes	MR80S	Yes	Yes	Yes	Yes
- Price if purchased separately	\$150	\$225	\$225	\$225	\$295	\$295		\$225
Package price	\$895	\$1,095	\$1,395	\$1,495	\$1,125 alk/\$1,260 NiCd	\$899	\$749	\$995

Manufacturer	Laser Reference Inc.	Leica Geosystems	Leica Geosystems	Mikrofyn Positioning Products	Mikrofyn Positioning Products	Mikrofyn Positioning Products	Mikrofyn Positioning Products	Mikrofyn Positioning Products
Model	L5	Rugby 100	Rugby 200	ML 10	ML 11	ML 13	ML 14i	ML 15i
Date of introduction	May-00	Feb-02	Feb-03	2003	2003	2003	2003	2003
Beam type	635 nm	635 nm visible laser diode	635 nm visible laser diode	650 nm visible	650 nm visible	650 nm Visible	635 high powered diode	635 high powered diode
Beam coverage	1,000 ft	1,000 ft/305 m	1,000 ft/305 m	> 1050' dia	> 1050' dia	> 1050' dia	> 1050' dia	> 1050' dia
Rotation speed	0-450 rpm	300/600 rpm [1]	60/120/300/600 rpm [1]	600	600	600	30/60/180/360/600 RPM + Scan	30/60/180/360/600 RPM + Scan
Compensation or self-leveling type	Compensated self-leveling	Electronic self-leveling [2]	Electronic self-leveling [2]	Electronic self-leveling	Electronic self-leveling	Electronic self-leveling H/V	Electronic self-leveling H/V	Electronic self-leveling H/V
Compensation or self-leveling range	±10 arc minutes	± 5° [3][4]	± 5° [3][4]	18%	18%	18%	18%	18%
Self-leveling speed		Typical: < 10 seconds	Typical: < 10 seconds	< 8 seconds typical	< 8 seconds typical	< 8 seconds typical	< 8 seconds typical	< 8 seconds typical
Accuracy								
- Degrees	±30 arc seconds	± 18 arc seconds or better	± 10 arc seconds or better	± 10 arc seconds	± 10 arc seconds	± 10 arc seconds	± 10 arc seconds	± 10 arc seconds
- Variance per 100 feet	±3/16 per 100'	± 3/32 in (± 2.6 mm)	± 1/16 in. (± 1.5 mm)	< 1/16 in (1.7 mm)	< 1/16 in (1.7 mm)	< 1/16 in (1.7 mm)	< 1/16 in (1.7 mm)	< 1/16 in (1.7 mm)
Power source	2 D alkaline/NiMH rechargeable	4 D cells/NiMH pack	4 D cells/NiMH pack	NiCad/NiMH 1 hr. charge [1][2]	NiCad/NiMH 1 hr. charge [1]	NiCad/NiMH 1 hr. charge [1][2]	NiCad/NiMH 1 hr. charge [1][2]	NiCad/NiMH 1 hr. charge [1][2]
Battery life								
- Alkaline	70	60 hours	50 hours					
- Rechargeable	45	35 hours	30 hours	30 hours	30 hours	30 hours	30 hours	30 hours
Operating temperature	0 to 122°F	-4 to 122°F / -20 to 50°C	-4 to 122°F / -20 to 50°C	-4 to 122° F (-20 to 50° C)	-4 to 122° F (-20 to 50° C)	-4 to 122° F (-20 to 50° C)	-4 to 122° F (-20 to 50° C)	-4 to 122° F (-20 to 50° C)
Water and dust sealed?	Resistant	IPX6	IPX6	Yes (IP 67)	Yes (IP 67)	Yes (IP 67)	Yes (IP 67)	Yes (IP 67)
Warranty	1 year	2-year knockdown [5]	2-year knockdown [5]	2 years	2 years	2 years	2 years	2 years
Laser Sensor included	Yes	Yes	Yes	Yes (IP 67)	Yes (IP 67)	Yes (IP 67)	Yes (IP 67)	Yes (IP 67)
- Price if purchased separately	\$150	\$150 to \$325	\$150 to \$325	\$325	\$325	\$325	\$325	\$325
Package price	\$649 with receiver	\$1,125 to \$1,455	\$1,520 to \$2,000	\$995	\$1,195	\$1,395	\$1,455	\$1,580

Numbers in brackets refer to notes (see page 62).

2006 Laser Survey

Electronic Levels (beam coverage up to 1,000 feet)

Manufacturer	NWI by NORTHWEST	NWI by NORTHWEST	SOKKIA	SOKKIA	SOKKIA	SOKKIA	Spectra Precision Laser
Model	NRL200	NRL800	LP31A	EL400H	EL400HV	MP400	LL300
Date of introduction	2003	2005	Feb-03	Nov-04	Nov-04	Nov-04	Jun-04
Beam type	635 visible	635 visible	InfraRED	Visible RED LED	Visible RED LED [1]	Visible RED LED [2]	635 - 670nm Visible
Beam coverage	1000 ft	1000 ft	800 ft	1,000 ft	1,000 ft	1,000 ft	1,000 ft
Rotation speed	0 - 600 rpm	0 - 600 rpm	600 rpm	0 to 600 rpm variable	0 to 600 rpm variable	0 to 600 rpm variable	600 rpm
Compensation or self-leveling type	Compensated	Electronic self-leveling H/V	Compensation	Self-leveling	Self-leveling	Self-leveling	Electronic self-leveling
Compensation or self-leveling range	± 4°	± 4°	± 10 minutes arc	± 5.7 degrees; 10%	± 5.7 degrees; 10%	± 5.7°; 10%	± 5°
Self-leveling speed		5 seconds	N/A	< 45 seconds	< 45 seconds	< 45 seconds	5°/min
Accuracy							
- Degrees			10 arc seconds	20 arc seconds	20 arc seconds	20 arc seconds	±18 arc seconds
- Variance per 100 feet	1/4 in	1/8 in	1/16 in @ 100 ft.	± 1/8 in @ 100 ft	± 1/8 in @ 100 ft	± 1/8 in @ 100 ft	±3/32 in
Power source	C-cell battery	C-cell battery	4 x D cell or NiCd	2 x D cell or NiCd	2 x D cell or NiCd	2 x D cell or NiCd	4 D cell NiCad
Battery life							
- Alkaline	20 hours	15 hours	90 hours	160 hours	160 hours	160 hours	90 hours
- Rechargeable			40 hours	40 hours	40 hours	40 hours	45 hours
Operating temperature	20 to 120°F	20 to 120°F	14 to 122°F	14 to 122°F	14 to 122°F	14 to 122°F	-5 to 45°C
Water and dust sealed?	IP64	IP64	IPX4	IPX4	IPX4	IPX4	Yes
Warranty	1 year	1 year	1 year	1 year	1 year	1 year	1 year
Laser Sensor included	No	No	LR100	TRG-R50	TRG-R81	TRG-R81	Yes
- Price if purchased separately	\$185	\$185	\$285	\$175	\$245	\$245	Contact Trimble rep
Package price	\$684	\$784	\$ 1,195	\$950	\$995	\$1,350	Contact Trimble rep

Manufacturer	Spectra Precision Laser	Spectra Precision Laser	Spectra Precision Laser	Topcon	Topcon	Western Latitudes/Pentax	Western Latitudes/Pentax
Model	LL200	HV301	1422-2	RL-H3C	RL-H3CS [3]	PLP-602	PLP-601
Date of introduction	Apr-02	Nov-03	Feb-01	Jan-02	Jan-03	Dec-05	Dec-05
Beam type	Infrared	3mW, 635 nm visible [1]	635 nm visible	Visible red laser diode	Visible red laser diode	Visible red laser diode	Visible red laser diode
Beam coverage	1,000 ft	1,000 ft	400 ft	980 ft (300 m)	980 ft (300 m)	800 ft	800 ft
Rotation speed	N/A	0/10/80/200/600 rpm	0/50/250/600 rpm	600 rpm	600 rpm	300 or 600 rpm	300 or 600 rpm
Compensation or self-leveling type	Compensation	Electronic self-leveling H/V	Manual, H/V	Electronic	Electronic	Electronic self-leveling	Electronic self-leveling
Compensation or self-leveling range	± 1°	± 5°	N/A	± 3 degrees	± 3°	± 5.7°	± 5.7°
Self-leveling speed	Instant when roughly leveled	5°/min	N/A	N/A	N/A	< 30 seconds	< 30 seconds
Accuracy							
- Degrees	±18 arc seconds	± 20 arc seconds	± 60 arc seconds	± 15 arc seconds	± 15 arc seconds	± 12 arc seconds	± 10 arc seconds
- Variance per 100 feet	±3/32 in	± 1/8 in	± 5/16 in	< 3/32 in (2.3 mm)	< 3/32 in (2.3 mm)	± 1/16	± 1/16
Power source	1 D cell alkaline	4 D cell NiCad	2 D cell alkaline	4 C cells	4 C cells	4 D alkaline	4 D alkaline
Battery life							
- Alkaline	100 hours	40 hours	40 hours	60 hours	60 hours	48 hours	48 hours
- Rechargeable	N/A	30 hours	N/A	N/A	N/A	Model 602R	Model 601R
Operating temperature	-20 to 50° C	-5 to 45°C	-5 to 45°C	-4 to 122° F (-20 to 50° C)	-4 to 122° F (-20 to 50° C)	-4 to 122°F	-4 to 122°F
Water and dust sealed?	Yes	Yes	Yes	Yes	Yes	IPX6	IPX6
Warranty	1 year	1 year	1 year	1 year	2 years	2 years	2 years
Laser Sensor included	Yes	Yes	Yes	LS-70C	LS-70B	Yes	Yes
- Price if purchased separately	Contact Trimble rep	Contact Trimble rep	Contact Trimble rep	\$195	\$365 [2]	\$295	\$295
Package price	Contact Trimble rep	Contact Trimble rep	Contact Trimble rep	\$895	\$1195 [3]	\$1,040	\$1,098

Numbers in brackets refer to notes (see page 62).

2006 Laser Survey

Laser Sensors (hand-held or rod mounted)

Manufacturer	AGATEC, div. of AGL	AGATEC, div. of AGL	AGATEC, div. of AGL	AGL	LaserMark by CST/berger	LaserMark by CST/berger
Model	MR50	MR80S	MR220 rod/machine combo	LS-44	LD400	LD120
Date of introduction	2004	2000	2004	2002	Aug-99	Jun-02
Beam detection range	1.6 in (40 mm)	1.6 in (40 mm)	5 in (130 mm)	2 in (50 mm)	2.0-in	2.0-in
Beam detection precision	± 1/16, 1/8 in	± 1/16, 1/8 in	± 1/16 (coarser on machine)	± 0, 1/32, 1/16, 1/8 in	±1/16 / ±1/8 / ±1/4 in	±1/16 / ±1/8 / ±1/4 in
Beam detection channels	3	3	5	5	7	3
Beam detection display	LCD (front/back)	LCD (front/back)	LCD/rod; LED/machine	LCD (front/back)	LCD (front and back)	LCD (front and back)
Beam detection angle	140°	90°	240°	± 45° (90°)	160°	160°
Audio beam detection signal	Yes, high/low selectable	Yes, high/low selectable	Yes, high/low selectable	Yes, high/low selectable	Yes	Yes
Laser status monitor and indication	No	No [4]	No	No	Manual only	Manual only
Power source	9V alkaline	9V alkaline	2 AA alkaline	2 AA alkaline	9 V battery	9 V battery
Battery life	50 hours	50 hours	Up to 3 months	150 hours	Up to 3 months	Up to 3 months
Power shut-off	Auto, 5 minutes	Auto, 5 minutes	Auto, 30 minutes	Auto, 30 minutes	[4]	[4]
Remote display	No	No	No	Optional	No	No
Rod clamp	Screw & quick release	Screw down	Clamp/magnets for machine	Yes, with reversible jaw	Heavy duty screw-down	Screw-down
Operating temperature	-4 to 122° F	-4° to 122° F	-4 to 140° F	-4 to 140° F	22 to 125° F	22 to 125° F
Water and dust sealed?	IP64	IP64	IP67	IP67	IPX4	IPX4
Warranty	1 year	1 year	2 years	2 years	1 year	1 year
Price	\$150	\$225	\$595	\$295	\$295	\$195

Manufacturer	DeWalt	Laser Reference Inc.	Laser Reference Inc.	Leica Geosystems	Leica Geosystems	Leica Geosystems
Model	DW0772	R5e	R7	Rod-Eye Pro	Rod-Eye Classic	Rod-Eye Mini
Date of introduction	Sept-02	Dec-04	Jun-00	Feb-02	Mar-04	Feb-02
Beam detection range	2 in	2 in	2 in	2 in /50 mm	2 in /50 mm	1.5 in /38 mm
Beam detection precision	± .04, ± .060	± 1/16 in	±1/16, 1/8, 1/64 in.	±.02, ±.04, ±.08, ±120 in	±.04, ±.120 in	± .08 in
Beam detection channels	2	5	5	7 [8]	5	Three
Beam detection display	LCD front and rear	LCD front	LCD front LED back	LCD (front/back)	LCD (front/back)	LCD
Beam detection angle	± 70°	120°	120°	± 45° (90°)	± 45° (90°)	± 45° (90°)
Audio beam detection signal	Yes	Yes	Yes	Yes, high/low selectable	Yes, high/low selectable	Yes, high/low selectable
Laser status monitor and indication	No	No	No	Yes, laser low battery	No	No
Power source	9v alkaline	9V	9V	2 AA batteries	2 AA batteries	2 AA batteries
Battery life		60 hours	60 hours	70+ hours	70+ hours	200 hours
Power shut-off	Yes	Yes, 12 minutes	Yes, 12 minutes	Yes [9]	Yes, 30 min	Yes, 30 min
Remote display	No	No	No	No	No	No
Rod clamp	Yes	Screw down	Screw down	Yes, with reversible jaw	Yes	Yes
Operating temperature	-7 to 50°C	0 - 122°F	0 - 122°F	-4 to 140°F / -20 to 60°C	-4 to 140°F / -20 to 60°C	-4 to 140°F / -20 to 60°C
Water and dust sealed?	Yes	Yes	Yes	Yes, 100%	Yes, 100%	Yes, 100%
Warranty	[3]	1 year	3 years	3 years	2 years	2 years
Price	\$249	\$150 incl. rod clamp	\$225 incl. rod clamp	\$325	\$250	\$150

Numbers in brackets refer to notes (see page 62).

2006 Laser Survey

Laser Sensors (hand-held or rod mounted)

Manufacturer	Mikrofyn Positioning Products	Mikrofyn Positioning Products	NWI by NORTHWEST	NWI by NORTHWEST	SOKKIA	SOKKIA
Model	HS 10	HS 14	NLD2K	NLD5G	LR100	MR310
Date of introduction	2003	2003	2003	2006	Apr-00	Jun-05
Beam detection range	2 in	2 in	1.8 in/48 mm	1.6 in/40mm	1 1/2 in	2 in
Beam detection precision	.001' to .04'	.001' to .04'	1/4 in/1/8 in	1/16 in/1/8 in	± 1/4; 1/8; 1/16 in	± 1/32; 1/16; 1/8 in
Beam detection channels	5	5	3	3	5	5
Beam detection display	LCD front & back + LED	LCD front & back + LED	LCD front & back	LCD front & back	Dual face LCD	Dual face LCD
Beam detection angle	135°	135°	90°	90°	90°	90°
Audio beam detection signal	3 Off/Low/High	3 Off/Low/High	Yes	Yes	Loud/normal/off	Loud/normal/off
Laser status monitor and indication	No	Yes, 2-way radio remote [3]	No	No	No	No
Power source	9 v Alkaline	9 v Alkaline	9 V battery	9 V battery	2 x AA	2 x AA
Battery life	3 months/200 hrs continuous	3 months/200 hrs continuous	90 hours	90 hours	100 hours	150 hours
Power shut-off	Yes, adjustable	Yes, adjustable	Yes	Yes	Yes, 10 minutes	Yes, 10 minutes
Remote display	Yes	Yes	No	No	No	Yes
Rod clamp	Yes	Yes	Quick release	Quick release	Screw down	Screw down
Operating temperature	-4 to 122° (-20 to 50°C)	-4 to 122° (-20 to 50°C)	22-120°F	22-120°F	14 to 122°F	-4 to 140°F
Water and dust sealed?	Yes	Yes	IP64	IP64	IPX7	IP67
Warranty	2 years	2 years	1 year	1 year	1 year	1 year
Price	\$325	\$400	\$185	\$195	\$285	\$295

Manufacturer	SOKKIA	SOKKIA	SOKKIA	SOKKIA	Spectra Precision Laser	Spectra Precision Laser
Model	R81	R50	MC550	MC500	HR100	HR300
Date of introduction	Nov-04	Nov-04	Nov-04	Nov-04	Nov-03	Nov-03
Beam detection range	1 5/8 in	1 5/8 in	5 in	6 3/4 in	2 in	2 in
Beam detection precision	1/16; 1/8 in	1/16; 1/8 in	3/32; 3/16; 1/12 in	1/4; 1/2; 1 in	1/8 in	1/16 and 1/8 in
Beam detection channels	3	3	5	5	3	5
Beam detection display	Dual face LCD	Dual face LCD	LCD and 2-color LED	LED	2 x LED	LCD and LED
Beam detection angle	90°	140°	240°	360°	90°	90°
Audio beam detection signal	Loud/normal/off	Yes, on/off	Yes, variable pitch	No	Yes	Yes
Laser status monitor and indication	No	No	No	No	Yes	Yes
Power source	9V alkaline	9V alkaline	2 x AA	4 x C cell alkaline	2 AA alkaline	2 AA alkaline
Battery life	50 hours	50 hours	160 hours	75 hours	100 hours	100 hours
Power shut-off	Yes, 5 minutes	Yes, 5 minutes	Yes, 30 minutes	75 minutes	Yes	Yes
Remote display	No	No	No	Yes, in-cab option	No	No
Rod clamp	Screw down	Screw down	Screw down & magnetic	Screw down	Yes	Yes
Operating temperature	14 to 122°F	14 to 122°F	-4 to 120°F	-4 to 140°F	-20 to 50°C	-20 to 50°C
Water and dust sealed?	IP64	IPX6	IPX6	IPX6	Yes	Yes
Warranty	1 year	1 year	1 year	1 year	1 year	1 year
Price	\$275	\$175	\$695	\$1,895	Contact Trimble rep	Contact Trimble rep

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Laser Sensors (hand-held or rod mounted)

Manufacturer	Spectra Precision Laser	Spectra Precision Laser	Topcon	Topcon	Topcon	Western Latitudes/Profile	Western Latitudes/Pentax
Model	HR550	CR600	LS-70A	LS-70B	LS-70C	LD-18N	LS6
Date of introduction	Dec-05	May-02	Jan-98	Jan-98	Jan-02	Jul-05	Dec-05
Beam detection range	2 in w/ anti-strobe sensor	4.5 in	2 in (50mm)	2 in (50mm)	2 in (50mm)	1.9 in	2.0 in
Beam detection precision	[4]	0.004 in - 3/4 in	± .04, ± .08 in [4]	± .04, ± .08 in [4]	± .04, ± .08 in [4]	± 1/16in, ± 1/8in, 1/4in	± 1/32 in, ± 3/32 in
Beam detection channels	15	15	11 [5]	11 [5]	11 [5]	7	
Beam detection display	LCD and bright LED	LCD and ultra-bright LED	Proportional LCD, front & rear	Proportional LCD, front & rear	LCD front	LCD (front & back)	LCD (front & back)
Beam detection angle	2 X 100°	270°	145°	145°	145°	120°	120°
Audio beam detection signal	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Laser status monitor and indication	Yes	Yes	Yes, HI alert & power [1]	Yes, HI alert & power [1]	Yes, HI alert & power [1]	No	No
Power source	2 AA alkaline	3 AA alkaline	9 volt alkaline	9 volt alkaline	9 volt alkaline	9V battery	9V battery
Battery life	100 hours	100 hours	Approx. 3 months	Approx. 3 months	Approx. 3 months	Up to 3 months	40 hours
Power shut-off	Yes	Yes	Auto, 30 minutes	Auto, 30 minutes	Auto, 30 minutes	Yes, 6 minutes	Yes, 10 minutes
Remote display	No	No	Optional, LCD	No	No	No	No
Rod clamp	Rod and machine magnetic	Rod and machine magnetic	Quick release	Universal	Standard	Screw down	Screw down
Operating temperature	-20 to 50°C	-20 to 50°C	-4 to 122° F (-20 to 50° C)	-4 to 122° F (-20 to 50° C)	-4 to 122° F (-20 to 50° C)	22 to 120°F	-4 to 122°F
Water and dust sealed?	Yes	Yes	Yes	Yes	Yes	IPX4	IPX4
Warranty	2 years	2 years	2 years	1 year	1 year	2 years	2 years
Price	Contact Trimble rep	Contact Trimble rep	\$495 [2]	\$365 [2]	\$195	\$225	\$295

Grade Lasers

Manufacturer	AGATEC, div. of AGL	AGL	AGL	AGL	CST/berger	CST/berger	David White by CST/berger
Model	A710	GradoPlane 10	EAGL 310 & 310XR	EAGL 350	57-LM400-4	57-LM800GR	3175
Date of introduction	2003	2004	1993	1993	Jun-99	Jan-05	Aug-03
Beam type	Visible split beam [3]	Visible split beam	Visible laser diode	Visible laser diode	[5]	[5]	[5]
Beam coverage	1,000 ft	1,000 ft	3,000 ft/4,000 ft XR	3,000 ft	Up to 2,000 ft	Up to 2,000 ft	Up to 2,000 ft
Grade capability and type	Dual axis/electronic	Dual axis/electronic	Dual axis/electronic	Dual axis/electronic	Dual	Dual	Dual
Grade range	-10 to 10% in X, Y,	-10 to 10% in X, Y,	-5 to 10%	-5 to 10%	± 10%	± 10%	± 10%
Grade entry method	Digitally with remote	Digitally with remote	Digitally	Digitally	Digitally	Digitally	Digitally
Remote operation	Yes, radio full 2-way	Yes, radio full 2-way	No	No	Remote capable	Remote capable	Remote capable
Grade alignment method	Visual sight	Visual sight	Scope optional	Scope optional	Peep sight	Peep sight	Peep sight
Self-leveling type	Electronic (horz. & vert.)	Electronic (horz. & vert.)	Electronic	Electronic	Electronic	Electronic	Electronic
Self-leveling range	± 5.7°	± 5.7°	± 5.7°	± 5.7°	± 5°	± 5°	± 5°
Rotation speeds	[5]	[5]	Variable up to 1,000 rpm	Variable up to 1,000 rpm	100-1000 rpm	100-1000 rpm	100-1000 rpm
Accuracy at 0.00% grade							
- Degrees	± 20 arc seconds	± 20 arc seconds	± 10 arc seconds	± 10 arc seconds			
- Variance per 100 feet	± 1/8 in	± 1/8 in	± 1/16 in	± 1/16 in	± 1/8 in	± 1/16 in	± 1/16 in
Temperature compensated	No	No			No	No	No
Primary power source	NiMh rechargeable	NiMh rechargeable	12V rechargeable	12V rechargeable	4 D alkaline batteries	Ni-Cad rechargeable pack	4 D alkaline batteries
Current draw (Amps per hour at 600 rpm)					165-170 mA	165-170 mA	165-170 mA
Operating temperature	14 to 122° F	14 to 122° F	0° to 120° F	0° to 120° F	22 to 120° F	22 to 120° F	22 to 120° F
Water and dust sealed?	IP67	IP67	IPX7	IPX7	IPX4	IPX7	IPX4
Warranty	1 year	1 year	1 yr; 2nd yr. opt. \$495	1 yr; 2nd yr. opt. \$495	2 years	2 years	2 years
Laser Sensor included	No	Yes [6]	No	No	Yes	Yes	No
Package price	\$3,295	\$3,895	\$6,240 or \$6,790 XR	\$6,740	\$1995	\$995	\$1995

Numbers in brackets refer to notes (see page 62).

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Grade Lasers

Manufacturer	Laser Reference Inc.	Laser Reference Inc.	Leica Geosystems	Leica Geosystems	Mikrofyn Positioning Products	Mikrofyn Positioning Products
Model	L1-AS	L1-AS Magnum	Rugby 400DG [6]	Rugby 300SG [6]	ML 11x	ML 13x w/ vertical
Date of introduction	Jan-94	Jun-05	Feb-05	Feb-05	2003	2004
Beam type	670 nm	670 nm	780 nm invisible laser diode	780 nm invisible laser diode	650 nm visible	650 nm visible
Beam coverage	2000'	3000'	2,500 ft/770 m	2,500 ft/770 m	> 1050' dia	> 1050' dia
Grade capability and type	[1]	[1]	Dual grade	Single grade	Single - electronic	Dual - electronic
Grade range	0-25%	0-25%	-5 to 25%	-5 to 25%	0.00 to 10.00%	0.00 to 10.00%
Grade entry method	Mechanical counter	Mechanical counter	Digital	Digital	Digital; in steps of .01%	Digital; in steps of .01%
Remote operation	No	No	Yes	No	No	No
Grade alignment method	Sight on top of laser	Sight on top of laser	Built in sights & telescope	Built in sights & telescope	Built-in sights	Built-in sights
Self-leveling type	Electronic servo motor	Electronic servo motor	Electronic	Electronic	Electronic	Electronic
Self-leveling range	± 4°	± 4°	± 5°	± 5°	0.18	0.18
Rotation speeds	600 rpm	600 rpm	300, 600, 900, 1200 rpm	300, 600, 900, 1200 rpm	600 rpm	600 rpm
Accuracy at 0.00% grade						
- Degrees	15 arc seconds	10 arc seconds	± 10 arc seconds or better	± 10 arc seconds or better	± 10 arc seconds	± 10 arc seconds
- Variance per 100 feet	± 3/32 per 100'	± 1/16 per 100'	± 1/16 in. (± 1.5 mm)	± 1/16 in. (± 1.5 mm)	< 1/16 in (1.7 mm)	< 1/16 in (1.7 mm)
Temperature compensated	Temp. stability tested	Temp. stability tested	No	No	Yes	Yes
Primary power source	[2]	[2]	Alkaline or NiMH pack [7]	Alkaline or NiMH pack [7]	NiCad/NiMH 1 Hr. charge [1]	NiCad/NiMH 1 Hr. charge [1]
Current draw (Amps per hour at 600 rpm)	[3]	[3]	250 ma	250 ma	60 ma (30 hrs runtime)	60 ma (30 hrs runtime)
Operating temperature	0 to 122°F	0 to 122°F	-4 to 122°F / -20 to 50°C	-4 to 122°F / -20 to 50°C	-4 to 122°F (-20 to 50°C)	-4 to 122°F (-20 to 50°C)
Water and dust sealed?	Resistant	Resistant	IPX7	IPX7	Yes (IP 67)	Yes (IP 67)
Warranty	3 years	3 years	1 year	1 year	2 years	2 years
Laser Sensor included	Yes R7	Yes R8	Yes	Yes	Yes	Yes
Package price	\$2,495	\$2,995	\$2,995	\$3,995	\$1,195	\$1,395

Manufacturer	Mikrofyn Positioning Products	Mikrofyn Positioning Products	Mikrofyn Positioning Products	Mikrofyn Positioning Products	Mikrofyn Positioning Products	Mikrofyn Positioning Products
Model	ML 14 VD	ML 3A	ML 3VD	ML 3	ML 4	ML 4B
Date of introduction	2004	2005	2000	2000	2000	2000
Beam type	635 high powered diode	635 high powered diode	670 nm	635 high powered diode	670 nm visible	670 nm visible
Beam coverage	> 1050' dia	> 5000' dia	> 3000' dia	> 3000' dia	> 3000' dia	> 3000' dia
Grade capability and type	Dual - electronic	Single - electronic	Single - electronic	Single - electronic	Dual - electronic	Dual - electronic
Grade range	0.00% to 10.00%	0.00% to 5.00%	0.00% to 10.00%	0.00% to 10.00%	-10% to 12%	-10% to 110%
Grade entry method	0.00 to 10.00%	Digital; in steps of .001%	Digital; in steps of .001%	Digital; in steps of .001%	Digital; in steps of .001%	Digital; in steps of .001%
Remote operation	Yes	No	No	No	Yes	Yes
Grade alignment method	Built-in sights	Built-in sights + scope	Built-in sights + scope	Built-in sights + scope	Built-in sights + scope	Built-in sights + scope
Self-leveling type	Electronic	Electronic	Electronic	Electronic	Electronic	Electronic
Self-leveling range	0.18	0.18	0.18	0.18	0.18	0.18
Rotation speeds	[4]	300/600 rpm	300/600 RPM	300/600 RPM	0 to 900 rpm	0 to 900 rpm
Accuracy at 0.00% grade						
- Degrees	± 10 arc seconds	± 5 arc seconds	± 5 arc seconds	± 5 arc seconds	± 5 arc seconds	± 5 arc seconds
- Variance per 100 feet	< 1/16 in (1.7 mm)	< 1/32 in (1.7 mm)	< 1/32 in (1.7 mm)	< 1/32 in (1.7 mm)	< 1/32 in (1.7 mm)	< 1/32 in (1.7 mm)
Temperature compensated	Yes	Yes	Yes	Yes	Yes	Yes
Primary power source	NiCad/NiMH 1 Hr. charge [1]	[5]	NiCad/NiMH 1 Hr. charge [1]	NiCad/NiMH 1 Hr. charge [1]	NiCad/NiMH 1 Hr. charge [1]	NiCad/NiMH 1 Hr. charge [1]
Current draw (Amps per hour at 600 rpm)	60 ma (30 hrs runtime)	60 ma (20 hrs runtime)	60 ma (20 hrs runtime)	60 ma (20 hrs runtime)	60 ma (20 hrs runtime)	60 ma (20 hrs runtime)
Operating temperature	-4 to 122°F (-20 to 50°C)	-4 to 122°F (-20 to 50°C)	-4 to 122°F (-20 to 50°C)	-4 to 122°F (-20 to 50°C)	-4 to 122°F (-20 to 50°C)	-4 to 122°F (-20 to 50°C)
Water and dust sealed?	Yes (IP 67)	Yes (IP 67)	Yes (IP 67)	Yes (IP 67)	Yes (IP 67)	Yes (IP 67)
Warranty	2 years	2 years	2 years	2 years	2 years	2 years
Laser Sensor included	Yes	Yes	Yes	Yes	Yes	Yes
Package price	\$1,655	\$4,000	\$4,400	\$4,900	\$5,000	\$6,000

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Grade Lasers

Manufacturer	Mikrofyn Positioning Products	SOKKIA	Spectra Precision Laser	Spectra Precision Laser	Spectra Precision Laser	Spectra Precision Laser
Model	ML4VD & L 4BVD	UL300	1242	GL710	GL720	GL722
Date of introduction	2000	Nov-04	2000	Jan-02	Jan-02	Jan-02
Beam type	670 nm visible	Visible RED LED	635 nm visible	670 nm visible	670 nm visible	670 nm visible
Beam coverage	> 5600 dia	1000 ft	2,600 ft	3,000 ft	3,000 ft	3,000 ft
Grade capability and type	Dual - electronic	Dual-axis electronic	Single	Single	Dual	Dual
Grade range	-10% to 12%/ -10% to 110%	± 10% in X and Y	0.1 to 25.0%	-0.5 to 25.0 %	[5]	[5]
Grade entry method	Digital; in steps of .001%	Digital remote keypad	Digitally	Digitally	Digitally	Digitally with remote
Remote operation	Yes	Yes	N/A	N/A	N/A	Yes, radio full 2-way
Grade alignment method	Built-in sights + scope	Peep	Visual sight	Telescope	Telescope	Automatic
Self-leveling type	Electronic	Electronic	Electronic self-leveling	Electronic self-leveling	Electronic self-leveling	Electronic self-leveling
Self-leveling range	0.18	± 10%	Up to 10% grade	Grade range	Grade range	Grade range
Rotation speeds	0 to 900 rpm	60-720rpm in 6 steps	0/50-300/600 rpm	300/600/900 rpm	300/600/900 rpm	300/600/900 rpm
Accuracy at 0.00% grade						
- Degrees	± 5 arc seconds	10 arc seconds	± 8 arc seconds	± 4.6 arc seconds	± 4.6 arc seconds	± 4.6 arc seconds
- Variance per 100 feet	< 1/32 in (1.7 mm)	± 1/8 in	< ± 1/16 in	± 1/32 in	± 1/32 in	± 1/32 in
Temperature compensated	Yes	No	Yes	Yes	Yes	Yes
Primary power source	NiCad/NiMH 1 Hr. charge [1]	Internal NiMH	Alkaline or NiCad	NiMH or NiCad	NiMH or NiCad	NiMH or NiCad
Current draw (Amps per hour at 600 rpm)	60 ma (20 hrs runtime)		80 alkaline/24 NiCad	30 NiMH/20 NiCad	30 NiMH/20 NiCad	30 NiMH/20 NiCad
Operating temperature	-4 to 122°F (-20 to 50°C)	14F to 122 F	-20 to 50° C	-20 to 50° C	-20 to 50° C	-20 to 50° C
Water and dust sealed?	Yes (IP 67)	IP67	Yes	Yes	Yes	Yes
Warranty	2 years	1 year	2 years	2 years	2 years	2 years
Laser Sensor included	Yes	No	Yes	Yes	Yes	Yes
Package price	\$5,500/\$6,500	\$3,295	Contact Trimble rep	Contact Trimble rep	Contact Trimble rep	Contact Trimble rep

Manufacturer	Spectra Precision Laser	Topcon	Topcon	Topcon	Topcon	Western Latitudes/Profile
Model	GL742	RL-H2Sa	RL-H1Sa	RT-5Sa	RT-5Sw	PLP-200
Date of introduction	Apr-05	Jan-02	Jan-02	Jul-98	Jan-06	Jul-05
Beam type	670 nm visible	Visible laser diode	Infrared diode	Visible laser diode	Visible laser diode	Visible red laser diode
Beam coverage	3,000 ft	2300 ft (700 m)	2300 ft (700 m)	4000 ft (1600 m)	3000' (1200 m)	2000 ft
Grade capability and type	Dual	Single and Dual slope, encoder	Single slope, encoder	Dual slope, encoder	Dual-slope, encoder [6]	Dual axis - electronic
Grade range	[6]	-8% to 8%	-5% to 10%	± 50%, no tilt required [6]	± 25% Y; ±10% X	± 10 %
Grade entry method	Digitally with remote	Digital	Digital	Digital (unit & remote)	Digital, with Grade Match	Digital
Remote operation	Yes, radio full 2-way	No	No	Yes, 2-way communication [7]	Yes, 2-way radio [7]	Yes (included)
Grade alignment method	Automatic	Manual, sighting scope	Manual, sighting scope	Automatic, SmartLine [8]	Automatic Smartline [8]	Sights on top of laser
Self-leveling type	Electronic self-leveling	Electronic	Electronic	DLX digital-liquid [9]	Digital	Electronic
Self-leveling range	Grade range	± 5°	± 5°	± 5°	± 5°	± 5°
Rotation speeds	300/600/900 rpm	300/600/900 rpm	300/600 rpm	300/600/900/1200 rpm	300/600/900 rpm	0 to 1000 rpm
Accuracy at 0.00% grade						
- Degrees	± 4.6 arc seconds	± 10 arc seconds	± 10 arc seconds	± 5 arc seconds	± 5 arc seconds	± 10 arc seconds
- Variance per 100 feet	± 1/32 in	less than 1/16 in (1.7 mm)	less than 1/16 in (1.7 mm)	less than 1/32 in (1 mm)	< 1/32 in (1 mm)	± 1/16
Temperature compensated	Yes	No	No	Yes [10]	Yes	No
Primary power source	NiMH or NiCad	Rechargeable NiMH	4 D cells	Rechargeable NiCad	Rechargeable NiMH	Ni-Cad or 4 D alkaline
Current draw (Amps per hour at 600 rpm)	30 NiMH/20 NiCad	175 ma	175 ma	175 ma	175 ma	170 mA
Operating temperature	-20 to 50° C	-4 to 122° F (-20 to 50° C)	-4 to 122° F (-20 to 50° C)	-4 to 122° F (-20 to 50° C)	-4 to 122° F (-20 to 50° C)	22 to 120°F
Water and dust sealed?	Yes	Yes	Yes	Yes	Yes	Yes
Warranty	2 years	2 years	1 year	2 years	2 years	2 years
Laser Sensor included	Yes	LS-70B	LS-70B	LS-70A	LS-70A	Yes
Package price	Contact Trimble rep	\$3,995	\$2,995	\$7695	\$6,995	\$1,995 NiCd [2]